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STANFORD UNIVERSITY SCHOOL OF MEDICINE
Department of Genetics

November 4, 1969

Dr. Herbert Friedman
Space Science Board
NAS/NRC
2101 Constitution Avenue
Washington, D. C.

Dear Herbert:

At a recent principal investigator meeting of the TV Experimenter Team of the Mariner Mars 1971 mission it became apparent that the present NASA planetary quarantine guideline for the decay life of an unsterilized Mars orbiter is that it remain in orbit at least until December 21, 1988. This is a result of confusion arising concerning two separate quarantine criteria: one which set the period of biological exploration through the period ending December 21, 1988, and the other which stated that unsterilized spacecraft in orbit should have a lifetime of fifty years.

The first condition was set so that, using quantitative models, allocations of specific risks could be made for individual missions as part of the overall 10^{-3} commitment. The purpose of the fifty year orbit decay period was different. It was to allow unsterilized orbiters to be launched even before the biological exploration had begun,with a period of decay long compared to the period of biological exploration. This was to permit remedial action such as removal of the decaying spacecraft from the atmosphere of Mars, if this was justified by the results of the biological exploration. This is difficult if the period of decay is equal to the period of biological exploration. It is also technologically and financially impossible to plan on the capability of remedial action for the 1980's.

An unsterilized spacecraft put in orbit in 1971 that will certainly and irreversibly contaminate Mars on December 22, 1988 should count as a violation of planetary quarantine in 1971. It is equivalent to the assertion that we have sufficient knowledge at that time to decide to contaminate the planet with a probability of unity. It is evident that this is contrary to the intent of the Panel on Planetary Quarantine in their report of the Consultative Group on Potentially Harmful Effects of Space Experiments, since in their report they stated "no nation should use up more than 15% of the total contamination risk during the first five years of exploration."

This conservatism is required not only because the "period" necessary for biological exploration is uncertain and subject to reevaluation after biological exploration <u>starts</u> in 1973, but because of the issue of the future potential utility of the planet. It has been recognized that discussion of this issue cannot sensibly commence before the acquisition of much more data concerning Mars. An irreversible commitment to contaminate before such consideration of future potential utility is irrational since the contamination itself may impose difficulty and costly, if not impossible, constraints.

We know of no meeting of NASA subcommittees or advisory groups, or Space Science Board committees at which a change in the fifty year in orbit criteria, established in 1964, was discussed. Such a change, if it is to be made, should be the result of explicit discussion and not left to interpretation or misinterpretation of the implications of policy decisions made concerning other quarantine criteria.

We have called this issue to the attention of Dr. Richard Young of the Bioscience Division, NASA Headquarters, and Mr. Lawrence Hall, NASA Planetary Quarantine Officer. Mr. Hall suggested alerting you so that it could be made the subject of urgent Space Science Board review. The orbits that are the basis of present scientific plans for the 1971 mission are, probably, compatible with a fifty year in orbit requirement. However, because of what appears to be a change in NASA policy, lifetimes in orbit as short as 17 years are now being considered. Since such considerations would impact hardware decisions and science planning now under way, immediate clarification is required.

Please keep us informed concerning any actions you plan to take about this matter.

Sincerely yours,

Joshua Lederberg Elliott C. Levinthal

cc: Dr. George Derbyshire
Dr. John Findlay
Mr. Lawrence Hall
Dr. C.-G. Heden
Dr. Orr Reynolds
Dr. Carl Sagan
Dr. Robert Steinbacher
Dr. Richard Young